

## **Market Operations – Long Term Planning**

### **1 Descriptions of Functions – Long Term Planning for Market Operations**

*All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work should be so noted.*

#### **1.1 Function Name**

*Name of Function*

Long Term Planning for Market Operations across 3 Western Regional Transmission Organizations (RTOs)

#### **1.2 Function ID**

*IECSA identification number of the function*

*M-1.1,M-1.2*

#### **1.3 Brief Description**

*Describe briefly the scope, objectives, and rationale of the Function.*

As the electricity industry is deregulated, and as FERC defines more clearly what the market operation tariffs will encompass, three possible Regional Transmission Organizations (RTOs) in the Western Interconnection are developing seamless interfaces for Market Participants to submit energy schedules and ancillary service bids across these 3 RTOs. The 3 RTOs are California ISO (existing ISO handling the electricity market in California), RTO West (potential RTO of many northwestern utilities), and WestConnect (potential RTO of many southwestern utilities). These 3 RTOs are developing the requirements for the Western RTO functions.

## 1.4 Narrative

*A complete narrative of the Function from a Domain Expert's point of view, describing what occurs when, why, how, and under what conditions. This will be a separate document, but will act as the basis for identifying the Steps in Section 2.*

The following is a list of Western RTO functions related to long term planning for market operations

Only the listed functions with asterisks are represented in the diagrams and/or step-by-step descriptions in section 2.

1. Long Term Planning
  - a. Registration of Market Participants
    - Credit rating of Market Participants
  - b. Capacity/Adequacy Market
  - c. Transmission and Generation Maintenance Coordination \*
    - Establish transmission and generation standards and guidelines
    - Oversee ISO grid planning
  - d. Updating the Power System Model \*
    - Register transmission data with WSCC EHV database
    - Perform WSCC path studies
    - Perform grid assessment
    - Perform new generation connection studies
    - Perform RMR studies
  - e. Generation certification

## 1.5 Actor (Stakeholder) Roles

*Describe all the people (their job), systems, databases, organizations, and devices involved in or affected by the Function (e.g. operators, system administrators, technicians, end users, service personnel, executives, SCADA system, real-time database, RTO, RTU, IED, power system). Typically, these actors are logically grouped by organization or functional boundaries or just for collaboration purpose of this use case. We need to identify these groupings and their relevant roles and understand the constituency. The same actor could play different roles in different Functions, but only one role in one Function. If the same actor (e.g. the same person) does play multiple roles in one Function, list these different actor-roles as separate rows.*

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Market Operations</i>		
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Area & Resource Operation Centers	Corporation	
AuditingPersonnel	Person	
DatabaseAdministrator	Person	
DisCos	Corporation	
DistributionSystem	System	
Eligible Customer Metered Entity	Person	
Eligible Customers	Person	
GenCos	Corporation	
IntervalMeterDevice	Device	
LGROwner	Person	
LoadProfile	Database	
MarketParticipant	Person	
Metered Entities	Corporation	
WeatherService	Corporation	
NERC	Corporation	

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Market Operations</i>		
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Other 2 RTOs	Corporation	
RetailCos	Corporation	
RTOOperator	Person	
RTOProgrammerEngineerPersonnel	Person	
RTOScheduler	Person	
SC-FTROwner	Person	
SchedulingCoordinator	Person	
SettlementAdministrator	Person	
SettlementDataMgmtAgent	Corporation	
CustomerMeterDevice	Device	
Tag Authority	Corporation	
TimeLineManager	Timer	
TransmissionOwner	Person	
TransmissionSystem	Power System	
WSCC	Corporation	

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Market Operations</i>		
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
PowerSystemModel	Database	
RTOPowerSystemModelPowerSystemModel	Database	
TransmissionOutageSchedule	Database	
LGRGenerationMaintenanceSchedule	Database	
EnergyScheduleDatabase	Database	
Long Term Load Forecast		
Maintenance Outage Function		

*Replicate this table for each logic group.*

## **1.6 Information Exchanged**

*Describe any information exchanged in this template.*

<i>Information Object Name</i>	<i>Information Object Description</i>

## 1.7 Activities/Services

Describe or list the activities and services involved in this Function (in the context of this Function). An activity or service can be provided by a computer system, a set of applications, or manual procedures. These activities/services should be described at an appropriate level, with the understanding that sub-activities and services should be described if they are important for operational issues, automation needs, and implementation reasons. Other sub-activities/services could be left for later analysis.

<i>Activity/Service Name</i>	<i>Activities/Services Provided</i>
Maintenance Outage Function	Analyzes maintenance outages
7-Day Load Forecast Function	Determines the long term load forecast
Western Market Interface Web Server	Manages the interface between the RTOs and the MarketParticipants

## 1.8 Contracts/Regulations

Identify any overall (human-initiated) contracts, regulations, policies, financial considerations, engineering constraints, pollution constraints, and other environmental quality issues that affect the design and requirements of the Function.

<i>Contract/Regulation</i>	<i>Impact of Contract/Regulation on Function</i>
Market Tariff	
Agreements between RTOs	

<i>Policy</i>	<i>From Actor</i>	<i>May</i>	<i>Shall Not</i>	<i>Shall</i>	<i>Description (verb)</i>	<i>To Actor</i>

<i>Constraint</i>	<i>Type</i>	<i>Description</i>	<i>Applies to</i>

## 2 Step by Step Analysis of Function

*Describe steps that implement the function. If there is more than one set of steps that are relevant, make a copy of the following section grouping (Preconditions and Assumptions, Steps normal sequence, and Steps alternate or exceptional sequence, Post conditions)*

### 2.1 Power System Model Update (PSMU)

*Name of this sequence*

#### 2.1.1 PSMU – Preconditions and Assumptions

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>

## 2.1.2 PSMU – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									<i>Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.</i>
1.1a	Periodically or as needed	TransmissionOwner	Update power system model	Provide updated transmission facilities model data and in-service dates	TransmissionOwner	PowerSystem Model	Transmission facilities		Inter-Control Center
1.1b	Periodically or as needed	GenCos	Update power system model	Provide updated generation facilities model data and in-service dates	GenCos	PowerSystem Model	Generation facilities		Inter-Control Center
1.1c	Periodically or as needed	DisCos	Update power system model	Provide updated connection point model data and in-service dates	DisCos	PowerSystem Model	Distribution facilities		Inter-Control Center
1.1d	Periodically or as needed	Eligible Customers	Update power system model	Provide updated connection point model data and in-service dates	Eligible Customers	PowerSystem Model	Customer facilities		Control Center / Corporations

<sup>2</sup> Note – A triggering event is not necessary if the completion of the prior step – leads to the transition of the following step.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.1e	Periodically or as needed	WSCC	Update power system model	Provide updated transmission facilities model data and in-service dates	WSCC	PowerSystem Model	WSCC transmission facilities		Inter-Control Center
1.1f	Periodically or as needed	RTOPowerSystemModelPowerSystemModels	Update power system model	Provide updated transmission facilities model data and in-service dates	RTOPowerSystemModelPowerSystemModels	PowerSystem Model	Other RTO transmission facilities		Inter-Control Center
1.2	Periodically or as needed	PowerSystem Model	Review updates	Review updates	PowerSystem Model	RTOProgrammerEngineerPersonnel	Updates		Intra-Control Center
1.3	After previous step	RTOProgrammerEngineerPersonnel	Review power model	Assure completeness and accuracy of updated model	RTOProgrammerEngineerPersonnel	PowerSystem Model	Power System model		Intra-Control Center
1.4a	After previous step	PowerSystem Model	Issue updated power system model	Issue updated power system model	PowerSystem Model	Eligible Customers	Power System model		Control Center / Corporations
1.4b	After previous step	PowerSystem Model	Issue updated power system model	Issue updated power system model	PowerSystem Model	DisCos	Power System model		Inter-Control Center
1.4c	After previous step	PowerSystem Model	Issue updated power system model	Issue updated power system model	PowerSystem Model	GenCos	Power System model		Inter-Control Center
1.4d	After previous step	PowerSystem Model	Issue updated power system model	Issue updated power system model	PowerSystem Model	TransmissionOwner	Power System model		Inter-Control Center
1.4e	After previous step	PowerSystem Model	Issue updated power system model	Issue updated power system model	PowerSystem Model	WSCC	Power System model		Inter-Control Center

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.4f	After previous step	PowerSystem Model	Issue updated power system model	Issue updated power system model	PowerSystem Model	RTOPowerSystemModelPowerSystemModels	Power System model		Intra-Control Center

### 2.1.3 PSMU – Steps – Alternative / Exception Sequences

*Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.*

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

### 2.1.4 PSMU – Post-conditions and Significant Results

*Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.*

*Describe any significant results from the Function*

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>

### 2.1.5 PSMU – Architectural Issues in Interactions

*Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number..*

### 2.1.6 PSMU – Current Implementation Status

*Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above  
Identify the key existing products, standards and technologies*

<i>Product/Standard/Technology</i> Eg. DNP 3	<i>Ref - Usage</i> 2.1.2.1[1] - Exchange of SCADA information

#### *Current Implementations:*

<i>Relative maturity of function across industry:</i>	<i>Ref - Status Discussion</i>
Very mature and widely implemented	Very common application within utilities, but not necessarily large RTOs
Moderately mature	
Fairly new	

<i>Relative maturity of function across industry:</i>	<i>Ref - Status Discussion</i>
Future, no systems, no interactions	

<i>Existence of legacy systems involved in function:</i>	<i>Ref - Status Discussion</i>
Many legacy systems	
Some legacy systems	
Few legacy systems	
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	
No changes will be needed	

<i>Implementation Concerns</i>	<i>Ref - Status Discussion</i>
Data availability and accuracy	
Known and unknown market pressures	
Known and unknown technology opportunities	

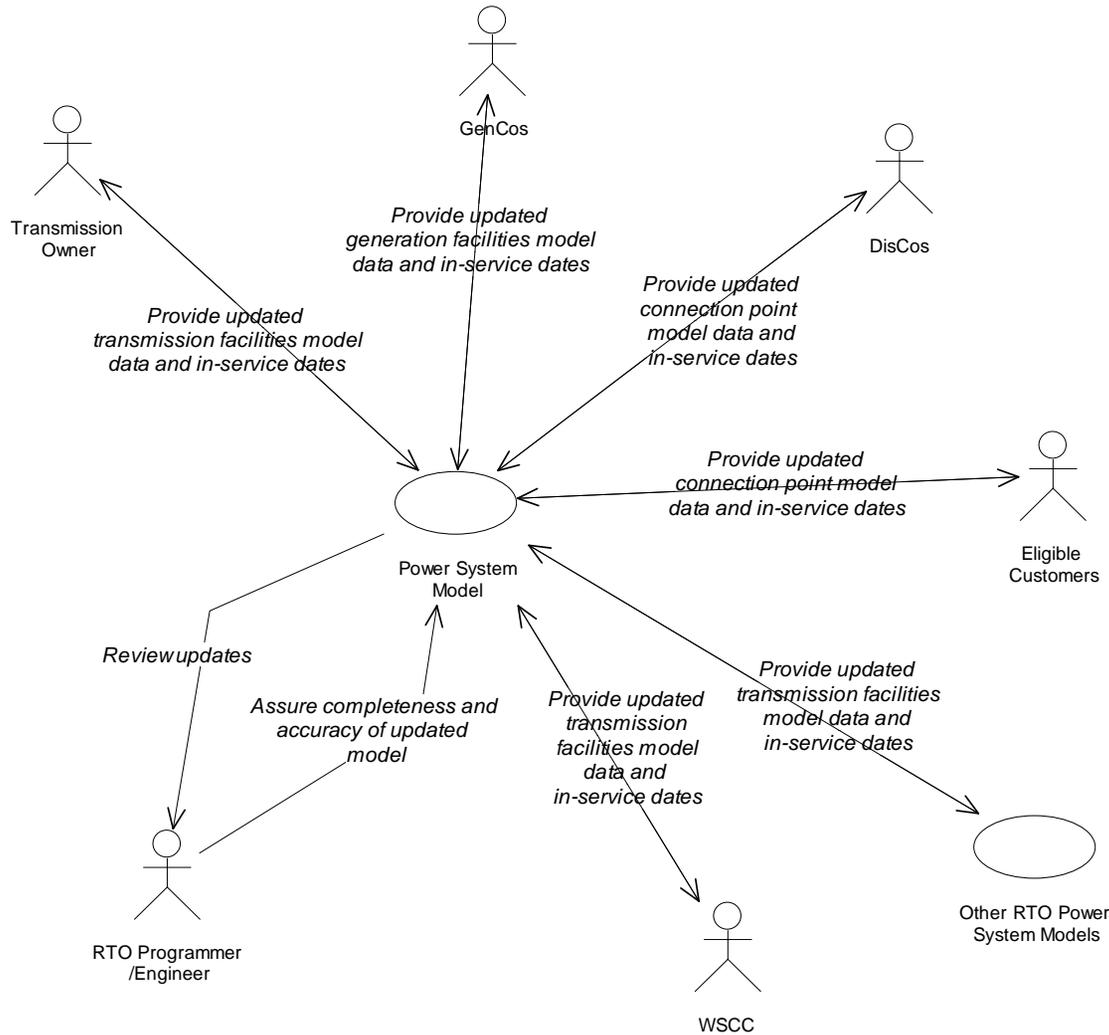
Validation of capabilities of function
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Cost vs. benefit
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### **2.1.7 PSMU – Diagram**

*For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.*

Power System Model Update Processes



## **2.2 Maintenance Coordination Function (MC)**

### **2.2.1 MC – Preconditions and Assumptions**

*Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities*

*Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place*

*Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be ‘filled in but unapproved’.*

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>

## 2.2.2 MC – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									<i>Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.</i>
2.1a	Periodically or upon event	Other 2 RTOs	Submit outage schedules	(1a) Submit relevant proposed transmission outage schedules	Other 2 RTOs	TransmissionOutageSchedule	Transmission outage schedules		RTOs / Market Participants
2.1b	Periodically or upon event	TransmissionOwner	Submit outage schedules	(1b) Submit long term proposed transmission outage schedules	TransmissionOwner	TransmissionOutageSchedule	Transmission outage schedules		Inter-Control Center
2.1c	Periodically or upon event	GenCos	Submit outage schedules	(1c) Submit long term proposed Local Generation Resources (LGR) generation maintenance schedules	GenCos	LGRGenerationMaintenanceSchedule	Generation maintenance schedules		Inter-Control Center
2.2a	After previous step	TransmissionOutageSchedule	Analyze outage schedules	(2a) Provide proposed transmission outage schedules	TransmissionOutageSchedule	MaintenanceOutageFunction	Transmission outage schedules		Inter-Control Center
2.2b		LGRGenerationMaintenanceSchedule	Analyze maintenance schedules	(2b) Provide proposed generation maintenance schedules	LGRGenerationMaintenanceSchedule	MaintenanceOutageFunction	Generation maintenance schedules		Inter-Control Center

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.2c		PowerSystem Model	Provide power system model	(2c) Provide Base Case model	PowerSystem Model	Maintenance Outage Function	Power system model		Intra-Control Center
2.2d		Long Term Load Forecast	Provide load forecast	(2d) Provide LT Load Forecast	Long Term Load Forecast	Maintenance Outage Function	Load forecast		Intra-Control Center
2.2e		EnergyScheduleDatabase	Provide energy schedules	(2e) Provide all schedules already submitted by SchedulingCoordinator and all existing contracts	EnergyScheduleDatabase	Maintenance Outage Function	Energy schedules		Intra-Control Center
2.3	At specific time and date	Maintenance Outage Function	Determine acceptable schedules	(3) Once a month on a specific day, work with maintenance outage requests to determine acceptable outage schedules	Maintenance Outage Function	RTOScheduler	Outage schedules		User Interface
2.4a	After previous step	RTOScheduler	Accept transmission outage schedule	(4a) Accept transmission outage schedule	RTOScheduler	TransmissionOutageSchedule	Accepted transmission outage schedules		User Interface
2.4b		RTOScheduler	Reject transmission outage schedule	(4b) Reject transmission outage schedule	RTOScheduler	TransmissionOutageSchedule	Rejected transmission outage schedules		User Interface
2.4c		RTOScheduler	Accept generation maintenance schedule	(4c) Accept generation maintenance schedule	RTOScheduler	LGRGenerationMaintenanceSchedule	Accepted generation maintenance schedules		User Interface

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.4d		RTOScheduler	Reject generation maintenance schedule	(4d) Reject generation maintenance schedule	RTOScheduler	LGRGenerationMaintenanceSchedule	Rejected generation maintenance schedules		User Interface
2.5a	After previous step		Transmission outage scheduling results	(5a) Receive acceptance or warning on transmission outage schedule	TransmissionOutageSchedule	Other 2 RTOs	Outage scheduling results		RTOs / Market Participants
2.5b			Transmission outage scheduling results	(5b) Receive acceptance or rejection of transmission outage schedules	TransmissionOutageSchedule	TransmissionOwner	Outage scheduling results		Intra-Control Center
2.5c			Generation maintenance results	(5c) Receive acceptance or rejection of LGR generation maintenance schedules	LGRGenerationMaintenanceSchedule	GenCos	Generation maintenance schedule results		Inter-Control Center

### 2.2.3 MC – Steps – Alternative / Exception Sequences

*Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.*

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

#### 2.2.4 MC – Post-conditions and Significant Results

*Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.*

*Describe any significant results from the Function*

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>

#### 2.2.5 MC – Architectural Issues in Interactions

*Elaborate on all architectural issues in each of the steps outlined in each of the sequences above.*

*Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).*



## 2.2.6 MC – Current Implementation Status

*Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above  
Identify the key existing products, standards and technologies*

<b><i>Product/Standard/Technology</i></b> Eg. DNP 3	<b><i>Ref - Usage</i></b> 2.1.2.1[1] - Exchange of SCADA information

### ***Current Implementations:***

<b><i>Relative maturity of function across industry:</i></b>	<b><i>Ref - Status Discussion</i></b>
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

<b><i>Existence of legacy systems involved in function:</i></b>	<b><i>Ref - Status Discussion</i></b>
Many legacy systems	
Some legacy systems	

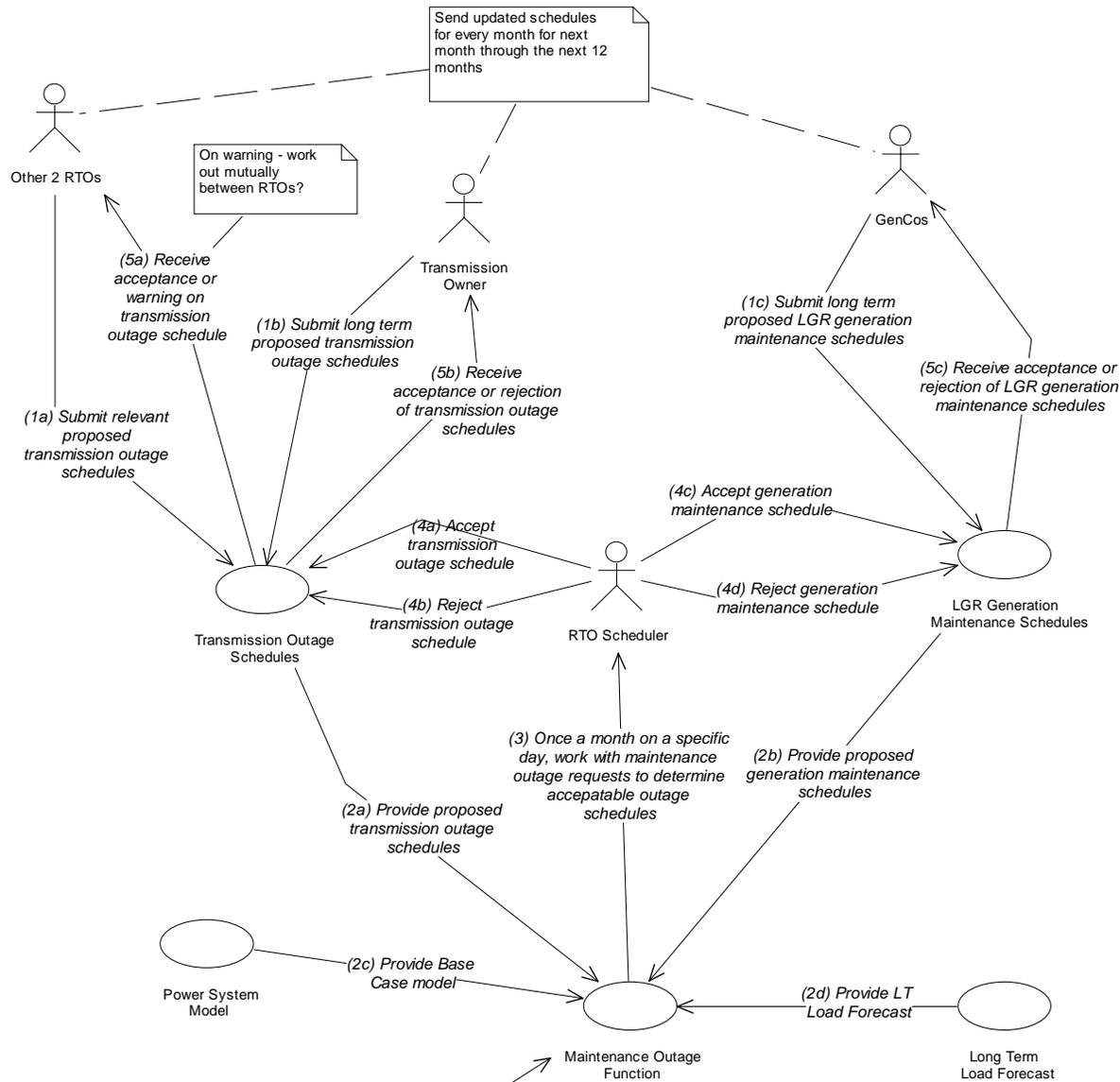
Few legacy systems	Few legacy systems
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	
No changes will be needed	

<i>Implementation Concerns</i>	<i>Ref - Status Discussion</i>
Data availability and accuracy	
Known and unknown market pressures	
Known and unknown technology opportunities	
Validation of capabilities of function	
Cost vs. benefit	

### **2.2.7 MC – Diagram**

*For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.*

Long Term Transmission Outage and LGR Generation Maintenance Coordination Processes



## 3 Auxiliary Issues

### 3.1 References and contacts

*Documents and individuals or organizations used as background to the function described; other functions referenced by this function, or acting as “sub” functions; or other documentation that clarifies the requirements or activities described. All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work must be so noted.*

ID	Title or contact	Reference or contact information
[1]		
[2]		

### 3.2 Action Item List

*As the function is developed, identify issues that still need clarification, resolution, or other notice taken of them. This can act as an Action Item list.*

ID	Description	Status
[1]		
[2]		

### 3.3 Revision History

*For reference and tracking purposes, indicate who worked on describing this function, and what aspect they undertook.*

No	Date	Author	Description
0.	February 27, 2004	Frances Cleveland	

No	Date	Author	Description

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